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George Schell

*University of North Carolina at Wilmington*

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# FACULTY PERCEPTIONS OF WEB-BASED COURSE EFFICACY

George P. Schell  
University of North Carolina at Wilmington  
[schellg@uncw.edu](mailto:schellg@uncw.edu)

## Abstract

*The efficacy of web-based course materials is a growing concern because an increasing proportion of course materials are being delivered via web resources. Some of the materials are being developed by faculty and some by other entities such as textbook publishers. The effectiveness of web-based course materials is important because of its increasing use.*

*“Distance learning” research has been used as a proxy for attesting the efficacy of web-based course materials. However, those studies are frequently based upon synchronous learning at a distance where mechanisms such as TV image transmission is used. Also, the technological savvy of students in such distance learning courses may impact their ability to learn from the materials. These issues suggest that research specifically on web-based course resource efficacy should be performed.*

*The persons with the greatest knowledge about web-based course resource efficacy are the faculty who have used such materials. Faculty perceptions of efficacy are an indirect but important measure.*

**Keywords:** Web-based course, distance learning, teaching efficacy

## Introduction

More and more resources are being channeled towards developing web-based courses. This phenomenon is occurring at all educational levels but this research is focused only on the university level. The question becomes “Are web-based course materials as effective as traditionally taught materials?”

There are many reasons why this question is important. First, the quality of the learning experience is very important to faculty (Schell, forthcoming). Also, certain student groups, such as those with disabilities and those who live away from the campus, find web-based course materials more accessible than traditional classroom lectures. The amount of materials that are web-based is growing whether those materials are generated by the faculty member, by a textbook publisher, or by some other source. Finally, students are expecting more web-based content as a result of their access to other web-based resources for entertainment, communication, and educational materials.

A number of initiatives have been built to aid the generation and use of web-based course materials. Merlot ([www.merlot.org](http://www.merlot.org)), the Harvey Project ([www.harveyproject.org](http://www.harveyproject.org)), and asynchronous learning materials at the Sloan Consortium ([www.aln.org](http://www.aln.org)) are only a few of the well-known resources. Certainly the efforts of the National Learning Infrastructure Initiative program sponsored by EDUCAUSE ([www.educause.edu](http://www.educause.edu)) have highlighted the importance of web-based course materials at universities. The growth of the infrastructure reflects the intent to increase web-based course materials usage in university courses.

The development of web-based materials has been nurtured by the infrastructure and faculty have responded. As of May 2003, there are almost 13,000 Merlot members of which more than 1,700 are in the Business category. The demand from students, the infrastructure development, and the interest from faculty has led to widespread web-based course materials development.

The question of web-based course materials efficacy compared to traditional course materials delivery can be studied from literature and from faculty developing the materials. In order to gauge faculty perceptions of efficacy a survey was developed (<http://152.20.206.45/asp/schellg/online.htm>). The responses came from 73 countries across many academic disciplines. The results reported in this article are limited to tenure track faculty at four-year institutions in the United States.

## **Previous Work**

Information technology can change the education process. Schank (1998) discusses one-on-one communication, experiential learning, and other ways for technology to impact learning. The experiential learning characteristic of web-based materials is important. Bruckman (2002) addresses the natural fit between constructivist learning theory and opportunities to support constructivist learning using web-based course materials. The potential for web-based materials to be effective is clear.

A body of research exists that suggests teaching with technology is as effective as traditional face-to-face lectures. Some researchers report that teaching with technology is superior to traditional methods. The technological dimensions add value to the learning process (Schell forthcoming, Bendunan-Fitch 2002). Communication among students and with the instructor can be improved (Alavi et al 1997, Borthick 2000) and students are more effective at building and sharing knowledge (Coppola et al 2002, Hiltz and Murray 2002).

Quantified results from a large population are frequently linked to general learning and to a relatively young population. The field of “programmed learning” is one that is more closely associated with early education rather than university course work. Much information about web-based course material efficacy at the university level has been reported from cases and anecdotal evidence. However, more research, especially about specific courses, is beginning to be presented (Borthick 2000, Kaynama and Keesling 2000).

The general consensus is that technology-based courses produce learning outcomes, such as grades and pass rates, that are the same as traditional face-to-face lecture courses. But a specificity to the consensus needs to be reached for university level course work. There are two reasons for this need, first the university environment is different from the environments of much of the original research. Second, web-based course materials are substantially different and improved today than they were even in the early and mid-1990s.

## **Efficacy**

The question of this research is whether or not the efficacy of web-based course materials is equal to traditional face-to-face delivered materials. Web-based materials in this research are defined as those which are delivered asynchronously via web resources. The interaction between students as well as between instructor and student is conducted via web resources. Examinations may be conducted face-to-face but other communication and course materials are delivered via the web.

Characteristics of the school and/or the faculty member have been suggested as influencing the perception of efficacy. For example, small schools generally have small class sizes and faculty may believe the more intimate knowledge of students in a small class would be compromised with web-based course materials. At the same time, faculty who teach large class sections may believe that the greater opportunity for communications afforded by web-based courses will enhance the learning experience. Faculty from public universities may respond differently than faculty from private universities.

Efficacy here will be measured as the faculty member’s judgment. Their judgment should be an accurate measure of efficacy since the faculty surveyed have experience with both web-based and traditional course materials. While it would be appropriate to conduct a large survey using quantifiable measures (grades, etc.) controlled for web-based versus traditional course delivery methods, such a survey would be a monumental task. Faculty judgment can act as a surrogate to such a survey and faculty can also temper such quantitative measures with their judgments based upon their teaching expertise.

## **Survey**

A survey was presented to faculty that had expressed their views concerning web-based course materials. All of the surveyed faculty had posted web-based course materials, commented upon or reviewed such materials, or in some other way expressed an

overt and public opinion about web-based course materials. The e-mail addresses of these faculty were collected and an message was sent asking them to complete a survey.

The survey included demographic questions about the respondent and his/her institution. School size, skills, year of degree, discipline, and many other questions were asked. The respondent was asked these questions before the question of interest was presented.

“How would you compare the effectiveness of a web-based learning experience to a traditionally taught learning experience?”

- 1) web-based experience is much less effective than traditionally taught experience
- 2) less effective than traditionally taught experience
- 3) equivalent to traditionally taught experience
- 4) more effective than traditionally taught experience
- 5) web-based experience is much more effective than traditionally taught experience

A total of 727 usable responses were received from 73 countries. Respondents were from universities and community colleges, from adjunct faculty to full professors, from disciplines as diverse as nursing to engineering. The results reported here are restricted to the 281 respondents who are in the United States, on tenure track, and at a four-year institution. There are reasons for and against limiting the analyzed data to this group but based upon the reliance of faculty judgment it was thought best to begin with this subgroup of respondents.

## Results

The full statistical analysis results are available at the author’s web page until December 2003. 65% of the respondents were male and 71% were tenured. 91% had an earned doctorate degree and 28% received their degree after 1993. 17% were faculty members with some administrative duties (such as department chair). 67% were in arts and sciences, 14% in the business school, 13% from education, 4% from engineering, and 6% from medicine or nursing. 40% were full professors, 32% were associate professors, and 28% were assistant professors.

Over 59% of respondents had taught a web-based course. Within the survey a web-based course was defined as a course where “... the large majority of the materials are consumed by students via the Web or other online resources. The entire course delivery does not have to be Web-based: for example, tests may be administered in a traditional classroom setting.”

The overall view was that web-based course materials were more effective than traditional course materials (see Table 1). 42% felt web-based materials were more or much more effective. This view was shared across demographics of school and faculty member. A chi-square test was performed and the variables that did not demonstrate statistically significant differences between demographic groups are shown in Table 2. It is interesting to note that respondents from schools which offer a doctorate degree were in agreement with schools not offering doctorates. Even more interesting is that faculty members’ perception of effectiveness did not differ from administrators’ views. Respondents believed web-based course materials were more efficacious than traditional materials when the respondents were tenured, in the business discipline, had more computer and web experience, had taught a web-based course, and had use web-based materials in courses they taught.

**Table 1. Distribution of Responses to “How would you compare the effectiveness of a web-based learning experience to a traditionally taught learning experience?”**

	Percent
web-based is much less effective	2.5%
web-based is less effective	18.2%
web-based is equivalent	37.2%
web-based is more effective	32.6%
web-based is much more effective	9.5%

**Table 2. Variables Which Did Not Demonstrate Statistical Significance When Measuring the Efficacy of Web-based Versus Traditional Course Materials**

1. gender of respondent
2. whether or not the respondent had a doctorate
3. whether or not the school offered a doctoral degree
4. whether or not the respondent's degree was after 1993
5. whether or not the respondent had administrative duties
6. whether or not the respondent was at a private or public school
7. whether or not the institution provided either financial or non-financial rewards for developing web-based course materials

Tenure status affected the view of web-based efficacy. Those respondents with tenure felt web-based course materials were more effective. Education, business, engineering, and medicine/nursing respondents rated web-based materials more effective than the disciplines in arts and sciences. Respondents who rated themselves more computer experienced and/or more web experienced rated the effectiveness of web-based materials higher. Table 3 lists those variables with statistically significant differences.

The highest levels of chi-square significance was shown when the respondent had taught a web-based course or had used web-based materials in a course. The response choices were "not at all", "sometimes", and "frequently." As frequency increased, the reported efficacy of web-based materials increased. Detractors might say this is a self fulfilling prophecy in that the higher regard a faculty member has for a teaching method, the more likely that method will be used. In reality it is a profound endorsement by faculty who believe in the effectiveness of web-based materials.

**Table 3. Variables Which Demonstrate Statistical Significance When Measuring the Efficacy of Web-based Versus Traditional Course Materials**

1. tenure (significance = .027) - tenured faculty believed web-based more efficacious
2. academic discipline (significance = .039) - business faculty believed web-based more efficacious than other disciplines as a whole
3. computer and web experience (significance = .036) - more computer and web experience led to higher marks for web-based efficacy
4. taught a web-based course (significance = .000) - faculty who had taught a web-based course felt they were more efficacious
5. used web-based materials in a course (significance = .000) - the more frequent use lead to higher measures of web-based efficacy

The significant difference between tenured and untenured faculty is less surprising than the fact that untenured faculty have a lower opinion of web-based course materials than tenured faculty. It can be argued that untenured faculty are typically more recent graduates and that would imply they may have more experience with web-based materials. A possible explanation is that it requires substantial effort required to develop web-based materials and that effort would come at the expense of research. Since research is the prime focus for many untenured faculty, they would have less effort available for developing and using high quality web-based materials.

It must be noted that even when there was a significant difference between groups of respondents, respondents always felt the efficacy of web-based course materials were superior to traditional materials.

## Conclusion

Faculty that have demonstrated an interest in web-based course materials believe those materials are more effective than traditional materials. It could be argued that the respondents in this study were biased in that the majority had actually used and/or created web-based materials. However, the respondents are in a better position to adequately judge web-based materials since

they have used and/or created both web-based and traditional materials. It would certainly weaken the results to solicit opinions about web-based material efficacy from faculty who had no first hand knowledge of the matter.

The survey results are important in that even when a statistically significant difference occurred between groups of respondents, each group still felt web-based course materials were more effective than traditional materials.

The survey supports previous research which found that technology enhanced materials are efficacious. It extends previous research in that reported increased effectiveness is broken down by a number of factors. Future research will be proposed to measure grades and similar measures to augment the responses from faculty.

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